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ABSTRACT

This instructor's guide accompanies the self-paced student training modules on plumbing available separately as CE 031 578. Introductory materials include a description of the components of the pre-apprenticeship project, discussion of teacher's role in students' completion of the modules, and scope and contents of Phase 2 training. Each of the 26 modules are briefly summarized according to this format: number of new vocabulary words; goal; performance indicators; overview and suggestions; description of any assignment(s) and/or job sheet(s) and listing of materials, tools, and equipment necessary to complete them; and supplementary references. An annotated bibliography contains references for further study and/or clarification of a topic. (YLB)

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PRE-APPRENTICESHIP

PHASE 2 TRAINING

Instructor's Guide

Plumbing

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Office of the President

July 27, 1981

On behalf of Lane Community College, I wish to express our pride and gratitude for the opportunity to participate in the development of the Pre-Apprenticeship training materials. We also wish to commend the Oregon Department of Education for its original concept and continued support; and, the Educational Linkages Component of the CETA Governor's Grant for funding.

The goals of this project are many, but none are more important than that of producing valid, understandable vocational curriculum material. We congratulate the tradespeople and production staff for thier accomplishments.

Finally, I recommend this material to anyone exploreing Pre-Apprenticeship as an entry into the vocational work world, with the hope and belief that it will go a long way toward producing skilled craftspeople who are dedicated to their work.

Sincerely,

Eldon G. Schafer

Eldon G. Schafer

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Phase II

INTRODUCTION

This is the second phase of a designed multi-phase project of pre-apprenticeship study. Phase II begins in earnest the development of manipulative skills essential to the trade. It re-introduces and elaborates on many of the tools, materials and equipment set forth in Phase I, and introduces projects and assignments designed to build trade knowledge and trade manipulative skills.

The project consists of three major components:

1) INSTRUCTOR'S GUIDE, containing a brief summary of each of the trade modules, including the materials, tools and equipment necessary to complete the Job Sheets and/or Assignments; an annotated bibliography for further study and/or clarification of a topic.

2) Self-paced LEARNING MODULES for student study. The modules are designed to impart trade knowledge and skills to the student. Each module is comprised of the following:
   a) Cover Sheet--lists module title, goals, performance indicators
   b) Study Guide--gives directions for completion of module
   c) Introduction (optional)--explains why the module is important
   d) Vocabulary--lists and defines any new trade terms or technical words necessary for understanding the module's content
   e) Supplementary References--details where to go for further study
   f) Information--provides information and graphics covering the module's topic(s)
   g) Self Assessment (optional)--provides students an opportunity to test their comprehension
   h) Assignment (optional)--enables students to research further into the topic
   i) Job Sheet (optional)--lists materials and tools necessary to complete the tasks which are designed to develop manipulative skill
   j) Post Assessment (optional)--enables the instructor to test student comprehension

3) SURVIVAL or COPING SKILLS MODULES have been developed to promote

social skills development. These 43 modules elaborate on the topics introduced in Phase I and cover such topics as: Losing your Driver's License, Death in the Family, Divorce, Time Management, Buying a Home, Maintaining Credit, and other social skills which have a bearing on the quality of work life and personal satisfaction.

IMPLEMENTATION

It is essential during Phase II that the student develop the skills necessary to perform the tasks of the trade as outlined and demonstrated in the modules. For this reason, the instruction should be conducted by a skilled craftsperson from the trade or occupation who has the necessary teaching skills.

At the completion of Phase II, the trainee will have enough experience with the occupation to decide whether to continue with the training into Phase III, which will ultimately represent a career choice and entrance into apprenticeship.

Recommendations for successful module completion

This phase of pre-apprenticeship study requires the student to develop job skills which will enable him or her to be a productive worker or to decide against pursuing the trade as a viable career choice. To that end, the instructor should:

1) Realize that skill-building and development is dependent on repeated physical performance and self-confidence.

2) Provide a setting in which students are encouraged to develop skills at their own individual pace. Assessments are designed as tests of comprehension, not as tests of skills or trade abilities.

3) Coordinate the use of materials, tools and equipment so that each student can fulfill his or her potential.

4) Ensure that each student practices the trade skills in the accepted manner, and practices enough to develop skills to a professional trade standard.

5) Make arrangements for visitations (to stores, shops, jobsites, etc.) and ensure that students participate fully.

6) Grade or comment on individual Assignments and Assessments, to ensure students are aware of their progress.

7) Ensure that the trade skills and knowledge presented in one module are fully understood by the student before allowing him or her to continue to subsequent modules.

SCOPE

Trades developed for study in Phase II include:

Drywall	Bricklaying
Painting	Parts Counter
Plumbing	*Electrical
Floor Laying	*Welding
Plastering	*Auto Mechanic
Cement Finishing	*Carpentry
Tilesetting	

* Adapted from previously developed ILS material.

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MODULE TITLE: HISTORY AND DEVELOPMENT OF PLUMBING

NUMBER IN SERIES: 1st of 26

NEW VOCABULARY WORDS: 14

GOAL:

The student will be able to explain the history and development of plumbing.

PERFORMANCE INDICATORS:

The student will successfully complete a Self and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

In addition to the history of plumbing, the student should be made aware of the responsibilities of a plumber: to ensure a safe and clean plumbing system; to ensure that the code is followed, etc.

(A plumbing code book may be used as reference in every module as a guide.)

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Colliers Encyclopedia (Vol. 19)
Encyclopedia Americana (Vol. 22)

MODULE TITLE: IDENTIFICATION OF PIPE MATERIALS

NUMBER IN SERIES: 2nd of 26

NEW VOCABULARY WORDS: 44

GOAL:

The student will be able to identify the different pipes used in plumbing and will be able to select the proper pipe and explain its use in the plumbing system.

PERFORMANCE INDICATORS:

The student will successfully complete a Self Assessment and a Job Sheet.

OVERVIEW AND SUGGESTIONS:

Since there are so many new vocabulary words (trade terminology) introduced in this module, the instructor may wish to devote extra time to it. Also, since this module and the next few introduce many new materials and fittings, the instructor may wish to arrange a field trip to a plumbing wholesale distributor to pick up pamphlets and literature on pipe materials, fittings and valves.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to identify and explain several types of pipe used in plumbing.

Requires: various types of copper tubing
PVC
no-hub cast iron

(be sure the identification of each section of pipe is clearly marked with its identity and specification standards)

SUPPLEMENTARY REFERENCES:

Oregon State Plumbing Specialty Code (Chapter II, p. 2-2)

MODULE TITLE: IDENTIFICATION OF FITTINGS

NUMBER IN SERIES: 3rd of 26

NEW VOCABULARY WORDS: 16

GOAL:

The student will be able to identify the different fittings and match them to pipe, and will be able to explain the different materials found in fittings.

PERFORMANCE INDICATORS:

The student will successfully complete a Self Assessment, an Assignment and a Job Sheet, and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

The student is required to visit a plumbing distributor and obtain written material.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to identify by sight various plumbing fittings. Requires: Tee, 45-degree elbow, male adaptor, union, reducing tee, plug, cap, 90-degree elbow (short turn), coupling, trap, combination, wye, sanitary tee, 90-degree elbow (long turn), double wye, closet bend.

SUPPLEMENTARY REFERENCES:

Audel's Plumbers and Pipefitters Library, pp. 63-79, 93-97.
Plumbing, pp. 18-35.

MODULE TITLE: IDENTIFICATION OF PLUMBING VALVES

NUMBER IN SERIES: 4th of 26

NEW VOCABULARY WORDS: 8

GOAL:

The student will be able to identify, explain the use of and assemble the different valves used in the plumbing industry.

PERFORMANCE INDICATORS:

The student will successfully complete the Self Assessment and will explain the valves presented in this module and their use in the plumbing system by completing a Job Sheet.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student will identify and disassemble and reassemble three valves.

Requires: gate valve
globe valve
ball valve

SUPPLEMENTARY REFERENCES:

MODULE TITLE: ADHESIVES

NUMBER IN SERIES: 5th of 26

NEW VOCABULARY WORDS: 8

GOAL:

The student will be able to explain the use of solvents, adhesives and lubricants as they are used in the plumbing trade.

PERFORMANCE INDICATORS:

The student will demonstrate an understanding of the subject by successfully completing a Self Assessment and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

As a safety precaution do not work with the ABS or PVC solvent cement in an enclosed area.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Plumbing Installation and Design, pp. 102-104, 108-109.

MODULE TITLE: CUTTING OF PIPE MATERIALS

NUMBER IN SERIES: 6th of 26

NEW VOCABULARY WORDS: 3

GOAL:

The student will be able to identify, select and demonstrate the appropriate tools used in the cutting of pipe and other materials.

PERFORMANCE INDICATORS:

The student will successfully complete a Self Assessment and a Job Sheet.

OVERVIEW AND SUGGESTIONS:

The materials cut in the Job Sheet may be used for the next module.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student will cut pipe with the tools described in the module. The instructor will dictate the measurements and students will cut 1) a center-to-center of two fittings, 2) a center-to-end of one fitting, 3) an end-to-end.

Requires: pipe cutter, tubing cutter, hacksaw, etc.
measuring device
pipe materials

SUPPLEMENTARY REFERENCES:

Audel's Plumbers and Pipefitters Library

MODULE TITLE: REAMING, CLEANING AND THREADING

NUMBER IN SERIES: 7th of 26

NEW VOCABULARY WORDS: 17

GOAL:

The student will be able to identify, select and demonstrate the use of the different tools.

PERFORMANCE INDICATORS:

The student will successfully complete a Self Assessment, and will clean and ream copper and plastic pipe. The student will also ream and thread galvanized and black pipe.

OVERVIEW AND SUGGESTIONS:

The materials cut in the 6th module may be used for the Job Sheet.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to clean, ream and thread pipe.
Requires cutting, reaming and threading tools applicable to complete Job Sheet to instructor's satisfaction.

SUPPLEMENTARY REFERENCES:

MODULE TITLE: ATTACHING PIPES AND FITTINGS WITH SOLDER

NUMBER IN SERIES: 8th of 26

NEW VOCABULARY WORDS: 17

GOAL:

The student will be able to:

1) Identify and select different materials and tools used in making a copper soldering joint.
2) Demonstrate the ability to join copper pipe and fitting with different types of solder and flux.

PERFORMANCE INDICATORS:

The student will successfully complete a Self Assessment, Job Sheet and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to set up oxygen, acetylene and propane systems, to solder material to make up a fitting.

Requires: soldering equipment, Type M copper tubing, 90-degree elbow copper, flux, 50-50 and 95-5 solder, Type L copper tubing, tee copper piece, silver solder.

SUPPLEMENTARY REFERENCES:

Home Guide to Plumbing, Heating & Air Conditioning, pp. 24-25.
Audel's Plumbers & Pipefitters Library, pp. 161, 163-4.

MODULE TITLE: ATTACHING PLASTIC PIPE AND FITTINGS WITH CEMENT

NUMBER IN SERIES: 9th of 26

NEW VOCABULARY WORDS: 6

GOAL:

The student will be able to:

1) Identify and select the proper materials and tools used in making a PVC and ABS pipe joint.
2) Demonstrate the ability to join plastic pipe and fitting together with plastic solvent cement.

PERFORMANCE INDICATORS:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to cut pipe and cement pieces to a Tee fitting.

Requires: 3/4" PVC Tee, 2 feet of 3/4" PVC pipe, primer and brush, solvent

SUPPLEMENTARY REFERENCES:

Plumber's and Pipefitter's Library, pp. 20-23.

Plumbing Installation and Design, pp. 108-109.

MODULE TITLE: ATTACHING THREADED PIPE AND FITTINGS

NUMBER IN SERIES: 10th of 26

NEW VOCABULARY WORDS: 6

GOAL:

The student will be able to identify and select the materials and tools that are used in the final process of making a screwed-on pipe joint, and will demonstrate the ability to join pipe and fitting.

PERFORMANCE INDICATORS:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to make up a threaded pipe and fitting.

Requires: 2 90° elbow ½" fittings, ½" schedule 40 black pipe, teflon tape.

SUPPLEMENTARY REFERENCES:

Plumber's and Pipefitter's Library, pp. 38-54.

Home Guide to Plumbing, Heating and Air Conditioning, pp. 16-18.

MODULE TITLE: PLUMBING SYSTEMS IN BUILDINGS

NUMBER IN SERIES: 11th of 26

NEW VOCABULARY WORDS: 17

GOAL:

The student will be able to identify and explain the proper procedure of installing pipe in the plumbing system.

PERFORMANCE INDICATORS:

The student will demonstrate an understanding of the subject by successfully completing a Self Assessment and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

A field trip to a building under construction could help the students comprehend plumbing systems' components.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Uniform Plumbing Code Illustrated Training Manual, Ch. II, pp. 126, 177.
Plumbing, Heating and Air Conditioning, p. 12.

MODULE TITLE: SOIL SYSTEM

NUMBER IN SERIES: 12th of 26

NEW VOCABULARY WORDS: 5

GOAL:

The student will be able to identify and explain the different types of pipe used in the soil system and their connections.

PERFORMANCE INDICATORS:

The student will demonstrate an understanding of the subject by successfully completing a Self Assessment and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

Again, the students could possibly benefit from visiting a building under construction.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Plumbing Installation and Design, pp. 91-93.

MODULE TITLE: WASTE SYSTEM

NUMBER IN SERIES: 13th of 26

NEW VOCABULARY WORDS: 8

GOAL:

The student will be able to identify and explain 1) the proper sizing of the fixtures, 2) the proper support of the piping, 3) the proper use of a trap.

PERFORMANCE INDICATORS:

The student will demonstrate an understanding of the subject by successfully completing a Self Assessment, a Post Assessment and by memorizing the table for waste pipe sizing.

OVERVIEW AND SUGGESTIONS:

The instructor may wish to review for the class the 11th module in the series as part of this module's study.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Uniform Plumbing Code Illustrated Training Manual, pp. 177, 183, 184, 185, 188-189.

Plumbing Installation and Design, pp. 113-116, 119-121, 123-124.

MODULE TITLE: VENT SYSTEM

NUMBER IN SERIES: 14th of 26

NEW VOCABULARY WORDS: 4

GOAL: The student will be able to identify and explain:

1) The reason for venting a plumbing drainage system.
2) The difference between a vent pipe and a waste pipe.
3) The proper installation of vent piping.
4) The table showing the fixture, trap size and vent size.

PERFORMANCE INDICATORS:

The student will demonstrate an understanding of the subject by successfully completing a Self Assessment and a Post Assessment and by memorizing the table for vent pipe sizing.

OVERVIEW AND SUGGESTIONS:

The piping drawing in the 11th module may be referred to.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Uniform Plumbing Code Illustrated Training Manual, pp. 199, 204-205, 207-208, 213.

Plumbing Installation and Design, pp. 131-133, 135, 137, 139, 141.

MODULE TITLE: WATER SYSTEM

NUMBER IN SERIES: 15th of 26

NEW VOCABULARY WORDS: 11

GOAL: The student will be able to identify and explain:

1) The importance of a safe and clean potable water supply.
2) The reason for the proper pipe sizing.
3) The proper materials used in the water pipe system.

PERFORMANCE INDICATORS:

The student will demonstrate an understanding of the subject by successfully completing a Self Assessment and a Post Assessment and by memorizing the water pipe sizing table.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Uniform Plumbing Code Illustrated Training Manual, pp. 253-255, 269.
Plumbing Installation and Design, pp. 181, 183, 185-187.

MODULE TITLE: GAS PIPING SYSTEM

NUMBER IN SERIES: 16th of 26

NEW VOCABULARY WORDS: 5

GOAL:

The student will be able to identify and explain the proper installation of the gas system, and its materials.

PERFORMANCE INDICATORS:

The student will complete a Self Assessment and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

The instructor may wish to invite a local gas company representative to discuss and possibly show films on the importance of a clean and safe gas system.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

MODULE TITLE: PLUMBING TESTS AND INSPECTION

NUMBER IN SERIES: 17th of 26

NEW VOCABULARY WORDS: 11

GOAL:

The student will be able to identify and select the proper testing method for each part of the plumbing system.

PERFORMANCE INDICATORS:

The student will demonstrate an understanding of the subject by successfully completing a Self Assessment, an Assignment and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

A plumbing inspector could explain the test steps, techniques and reasons for testing and inspection.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Uniform Plumbing Code Illustrated Training Manual, pp. 292, 306-307, 404.

MODULE TITLE: TUB AND SHOWER

NUMBER IN SERIES: 18th of 26

NEW VOCABULARY WORDS: 6

GOAL:

The student will be able to identify and explain the different types of tubs and showers, and will demonstrate the proper installation of those fixtures.

PERFORMANCE INDICATORS:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to install a tub and shower with fittings, valves, adhesives and tools required.

Requires: recessed tub
waste and overflow unit
shower base and drain
putty
tools

SUPPLEMENTARY REFERENCES:

Plumbing Installation and Design, pp. 218-221.

MODULE TITLE: LAVATORY

NUMBER IN SERIES: 19th of 26

NEW VOCABULARY WORDS: 4

GOAL: The student will be able to identify and explain:

1) The different types of lavatories
2) The proper installation of the lavatories and valves with trim

PERFORMANCE INDICATORS:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to install a wall-hung lavatory unit.

Requires: wall-hung lavatory unit
fittings
tool box
putty

SUPPLEMENTARY REFERENCES:

Plumbing Installation and Design, pp. 214-218.

MODULE TITLE: WATER CLOSET

NUMBER IN SERIES: 20th of 26

NEW VOCABULARY WORDS: 4

GOAL:

The student will be able to identify and explain the different types of water closets and the proper installation of these fixtures.

PERFORMANCE INDICATORS:

The student will demonstrate an understanding of the subject by completing a Self Assessment, a Job Sheet and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to install a water closet.

Requires: rough plumbed room
water closet assembly
tools

SUPPLEMENTARY REFERENCES:

Plumbing Installation and Design, pp. 201-207.

MODULE TITLE: KITHCHEN SINK-GARBAGE DISPOSAL-DISHWASHER

NUMBER IN SERIES: 21st of 26

NEW VOCABULARY WORDS: 1

GOAL:

The student will be able to identify and explain the types of kitchen sinks and related fixtures and the proper installation of the fixtures and required valves.

PERFORMANCE INDICATORS:

The student will complete a Self Assessment, a Job Sheet and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to connect a faucet, garbage disposal and dishwasher to a double compartment sink, and to connect all piping.

Requires: double compartment kitchen sink, faucet, garbage disposal, piping, caulking, tools

SUPPLEMENTARY REFERENCES:

Plumbing Installation and Design, pp. 222-226.

MODULE TITLE: LAUNDRY TUB

NUMBER IN SERIES: 22nd of 26

NEW VOCABULARY WORDS: 0

GOAL: The student will be able to identify and explain:

1) The different types of laundry tubs and connections
2) The proper installation of these fixtures and valves

PERFORMANCE INDICATORS:

The student will complete a Self Assessment, a Job Sheet and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to assemble and install a laundry tray.

Requires: laundry tray and fixtures
plumbing tools

SUPPLEMENTARY REFERENCES:

Plumbing Installation and Design, pp. 226-227.

MODULE TITLE: WATER HEATER

NUMBER IN SERIES: 23rd of 26

NEW VOCABULARY WORDS: 12

GOAL:

The student will be able to identify and explain:

1) The different types of water heaters.
2) The safe connection and operation of water heaters.

PERFORMANCE INDICATORS:

The student will complete a Self Assessment, an Assignment and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

The student is required to collect and submit information on the water heater in his or her home.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Plumbing Installation and Design, pp. 235-237.

MODULE TITLE: REPAIR

NUMBER IN SERIES: 24th of 26

NEW VOCABULARY WORDS: 4

GOAL:

The student will be able to identify and explain different types of repair to valves, water closets and water heaters.

PERFORMANCE INDICATORS:

The student will successfully complete a Self Assessment, a Job Sheet and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

The student is required to disassemble and reassemble a faucet.

Requires: faucet assembly
tools
washer
valve seat and tool

SUPPLEMENTARY REFERENCES:

Plumbing, pp. 465, 472-473.

MODULE TITLE: SEWER CLEANING AND TOOLS

NUMBER IN SERIES: 25th of 26

NEW VOCABULARY WORDS: 0

GOAL:

The student will be able to identify and explain the different types of cleaning methods and types of sewer cleaning equipment.

PERFORMANCE INDICATORS:

The student will complete a Self and Post Assessment.

OVERVIEW AND SUGGESTIONS:

Using electric tools, especially around water, can be dangerous. The instructor should use his or her resources to emphasize this.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Plumbing, pp. 472-473.

MODULE TITLE: SPECIALTY BUILDINGS

NUMBER IN SERIES: 26th of 26

NEW VOCABULARY WORDS: 3

GOAL:

The student will be able to identify and explain the different types of equipment, fixtures and piping used in hospitals, schools and restaurants.

PERFORMANCE INDICATORS:

The student will complete a Self Assessment and a Post Assessment.

OVERVIEW AND SUGGESTIONS:

The material in the module can be illustrated by taking a field trip to a specialty building and touring the plumbing systems. A stationary engineer or maintenance person can shed light on the intricacies of the systems.

ASSIGNMENT(S) DESCRIPTION AND MATERIALS REQUIRED:

None.

JOB SHEET DESCRIPTION AND MATERIALS AND TOOLS REQUIRED:

None.

SUPPLEMENTARY REFERENCES:

Uniform Plumbing Code Illustrated Training Manual, pp. 216-219, 330-332.

BIBLIOGRAPHY

HOME GUIDE TO PLUMBING, HEATING AND AIR CONDITIONING
George Daniels
Popular Science Publishing Co., Harper & Row, New York
(1967)

A very good resource for instructors on materials and repair work.

OREGON STATE PLUMBING SPECIALTY CODE
International Association of Plumbing and Mechanical Officials
5032 Alhambra Ave.
Los Angeles 90032
(1981)

Definitive, a must if to be used in the state of Oregon.

PLUMBERS AND PIPEFITTERS LIBRARY
Charles McConnell
Theodore Audel & Co., Howard W. Sams & Co.
4300 W. 62nd St.
Indianapolis 46208

A good reference, but far too advanced for pre-apprenticeship study.

BIBLIOGRAPHY

PLUMBING
Harold E. Babbitt
McGraw Hill, New York
(1960)

Contains plumbing fundamentals based on plumbing practices of the east coast of the U.S.

PLUMBING INSTALLATION AND DESIGN
L.V. Ripka
American Technical Society
(1978)

Very useful reference for all phases of plumbing, but the tables are based on the Minnesota state plumbing code.

UNIFORM PLUMBING CODE ILLUSTRATED TRAINING MANUAL
International Association of Plumbing and Mechanical Officials
5032 Alhambra Ave.
Los Angeles 90032
(1979 Ed.)

A good reference covering nearly all pre-apprenticeship topics covered in the modules.